Franklin
Computer

PC 8000™

USER'S REFERENCE MANUAL

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Franklin Computer Corporation
Route 73 and Haddonfield Road
Pennsauken, NJ 08110
(609) 488-0600

40 MB Harddrive
3.5" External drive   (Dishutte drive?)
_____

Printer (Parallel) Epson
15 pin joystick
_____

Battery for internal clock (speed boost?)
640k expansion
_____

MPP
MIDI keyboard

Preface

Introducing the Franklin PC 8000 from the Franklin family of personal computers, the versatile computer at a popular price!

Get to know the parts that make up the PC 8000 in Chapter One.

Install the system properly by referring to Chapter Two.

Power on the system and learn what we have in store for you in Chapter Three.

Next comes the keyboard, the all powerful middleman between you and the computer, in Chapter Four.

Chapter Five is all about MS-DOS, the operating system that makes the PC 8000 run.

Useful information such as pin-out signals, 8088 instruction sets, etc. are listed in the Appendices.

It's time to start having fun with your Franklin PC 8000!

FCC Statement

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna

Relocate the computer with respect to the receiver

Move the computer away from the receiver

Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems."

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

WARNING

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (Computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

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SOFTWARE END USER LICENSE AND LIMITED
WARRANTY

For information about revisions to software described in this manual, you should periodically check with your authorized Franklin dealer.

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Chapter 1

Getting Started

The first thing to learn about your computer is the different configurations that made up a complete system. This chapter is all about these configurations and a brief description on their functions.

Every complete computer system consists of:

1.1 The System Unit

The system unit is the personal computer itself and it comes in the form of an attractively designed box measuring about 400 x 120 x 380 mm. Housed inside are the different vital parts that make the system unit function. These include the Central Processing Unit (CPU) which is also referred to as the heart of the computer, the power supply, fan, motherboard, peripheral interfaces and circuitries, etc.

1.1.1 The Front Panel

The efficient-looking front panel of the system unit suits even the most discriminating tastes.

LED
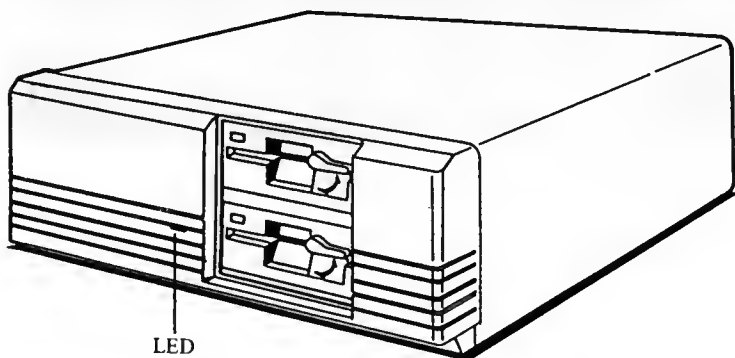
Fig. 1-1 The Front Panel

1.1.2 The Rear Panel

Important features on the rear panel like the power switch, sockets and connectors provide convenience for connecting peripherals like the keyboard, printer and monitor to the system unit.
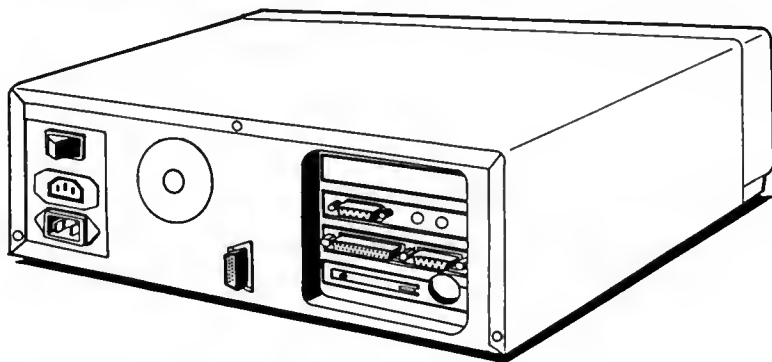
Fig. 1-2 The Rear Panel

1.2 The Video Display

With the proper display adapter card, the system unit can support three kinds of displays, namely, the monochrome display, the color graphics display and the monochrome graphics display.

Some models are provided with a Color Graphics Adapter (or CGA for short) for supporting a color graphics monitor.

For models without the CGA, the the user can add any of the three display adapters accordingly to support his monitor.

Contact your local Franklin dealer for the proper display adapter to suit your needs.

1.3 The Disk Drives

Two built-in half height 5-1 4" floppy disk drives occupy the upper bunk of the system unit. The disk drives are double sided and can format 40 tracks on each side of the diskette.
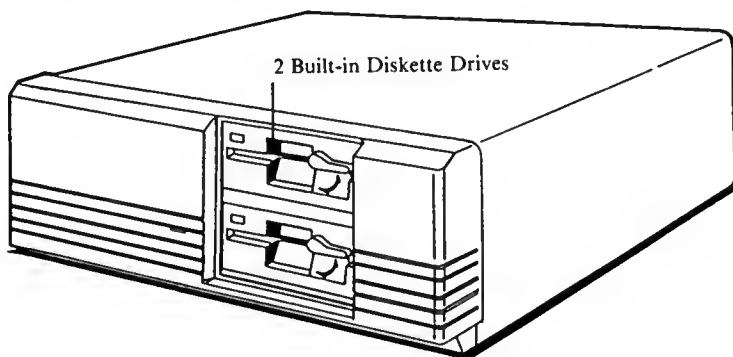
Fig. 1-3 The Disk Drives

1.4 The Keyboard

Provided with the system is a 84-key typewriter style keyboard. The keys are low profile, full travel, sculptured type. In additional to the standard typewriter keys, there are the function keys, cursor control keys and numeric keypad for user convenience.

The keyboard can also be inclined for typing comfort. To tilt the keyboard, pull out the two pivotal legs at the bottom. Refer to Chapter Four for details on keyboard usage.
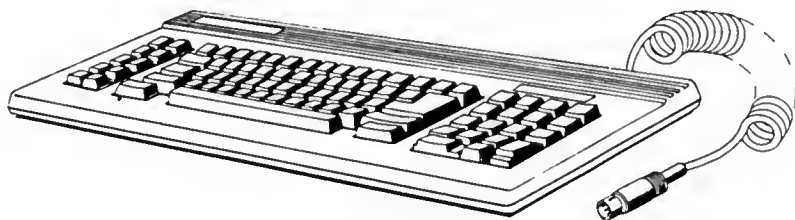
Fig. 1-4 Keyboard

1.5 The Rear Panel Connectors and Switch

The power switch, peripheral sockets and connectors are located at the rear panel of the system unit as shown in Fig. 1-5.

System Power Socket
Video Power Socket
System Power Switch
Video Connector

Keyboard Connector
Serial Port
Game Port
Parallel Printer Connector
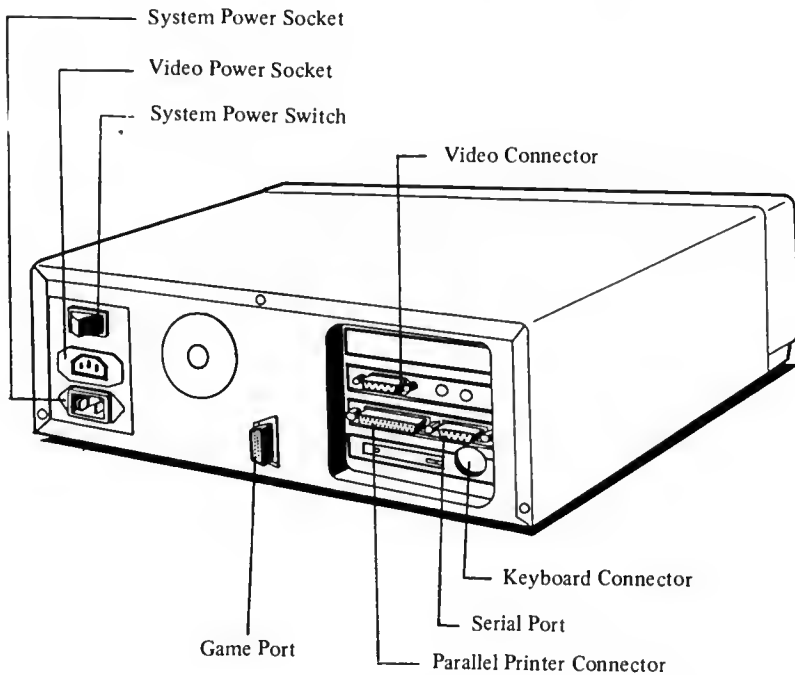
Fig. 1-5 The Rear Panel

1.5.1 The System Power Socket

Power is supplied to the system unit by means of a power cable. The three-prong male socket from the cable should be plugged to the system power socket in the rear panel as shown in Fig. 1-6. The other end of the cable is plugged to the power source.
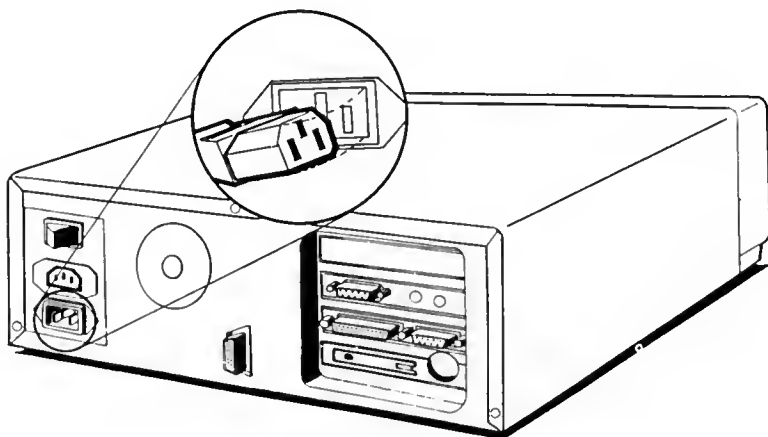
Fig. 1-6 System Power Socket

1.5.2 The System Power Switch

The power switch is located at the upper left corner of the rear panel. The power to the system is turned on and off using this switch.
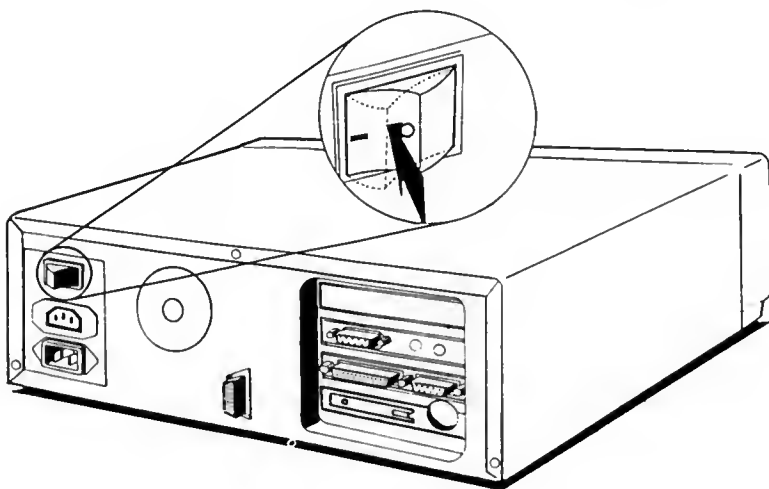
Fig. 1-7 System Power Switch

1.5.3 The Monitor Power Socket

For monochrome monitors, the monitor power cable should be connected to the video monitor power socket located below the system power switch. Color monitors are usually plugged directly to the power outlet.
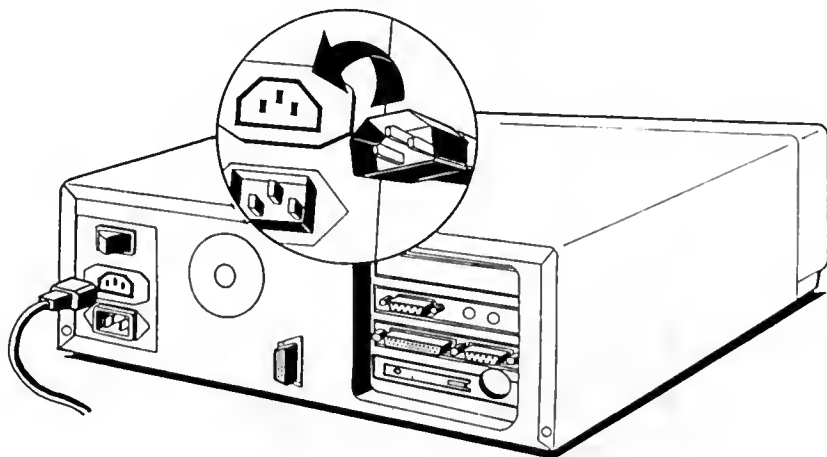
Fig. 1-8 Video Monitor Power Socket

1.5.4 The Keyboard Connector

The keyboard connector (Fig. 1-9) provides the interface between the
system unit and the keyboard.
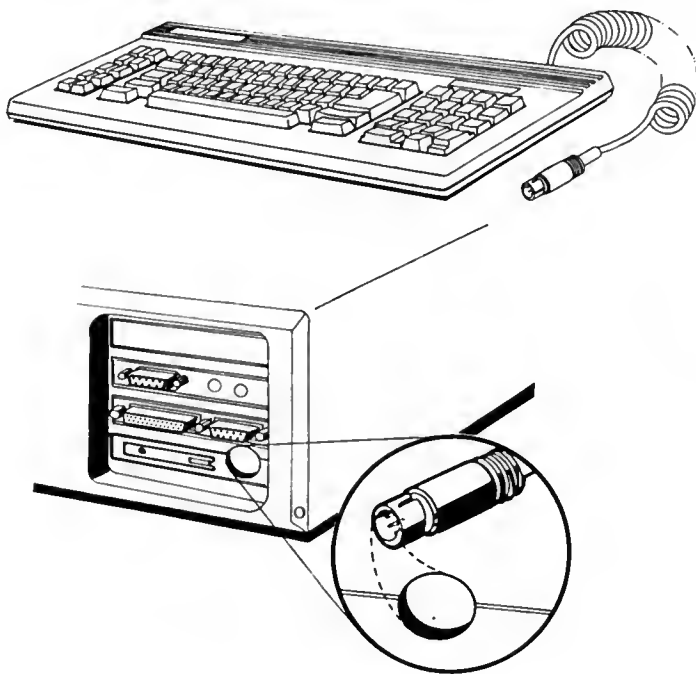
Fig. 1-9 The Keyboard Connector

1.5.5 The Asynchronous Communications (EIA-RS-232) Interface Connector

The asynchronous communications port is also referred to as the serial port or the RS232 port. This port provides interface between the system unit and serial devices such as modems, mice, plotters, multiplexors, serial printers, etc.

A 9-pin D-connector Asynchronous Communications connector (COM1) is provided on the IO Board and it can be accessed from the rear panel as shown in Fig. 1-10. COM1 serves as an interface for modem, serial printer or other serial devices.

For pin-out signals, refer to Appendix B.
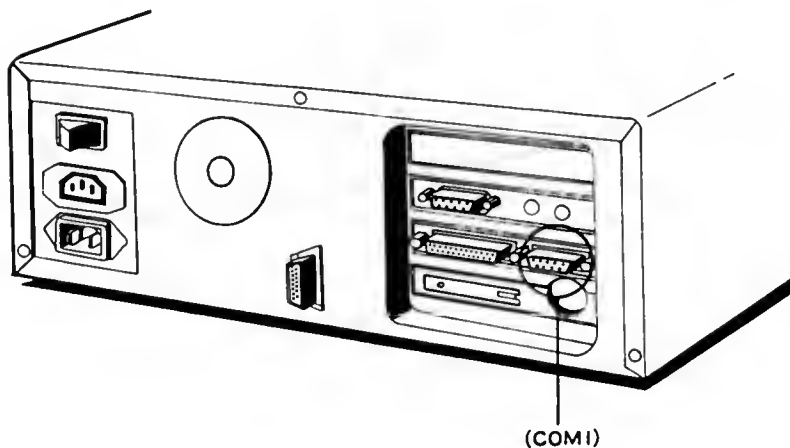
(COM1)

Fig. 1-10 Asynchronous Communication Interface Port (COM1)

1.5.6 The Parallel Printer Interface (LPT2)

The parallel (or Centronics) printer interface is a 25-pin D-type connector located on the IO board. It provides connection for IBM compatible parallel printers.

PARALLEL INTERFACE
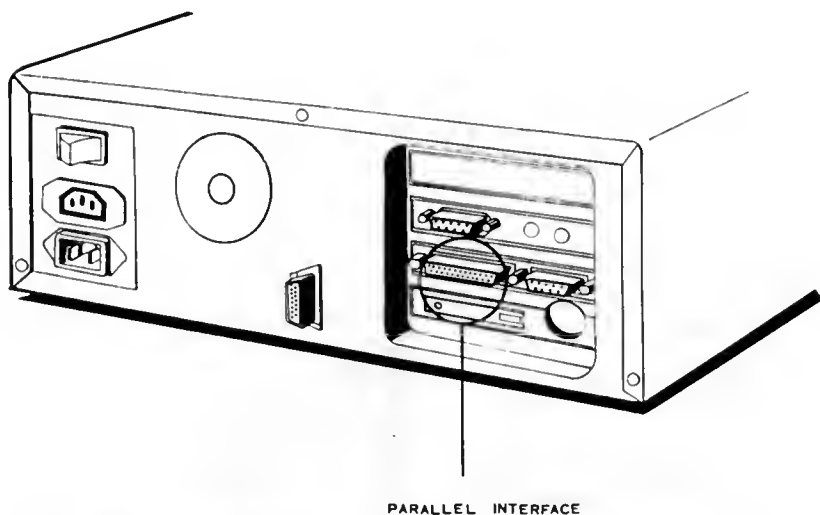
Fig. 1-11 Parallel Printer Interface

1.6 The MotherBoard and Expansion Slots

Inside the system unit is a vertical motherboard that supports four horizontal expansion slots. Add-on cards are inserted horizontally into these slots as against the conventional vertical insertion.

The CPU card is inserted in the lowest slot while the IO board occupies the next-to-lowest slot.

A display card may or may not be added into one of the two upper slots depending on your model. For details on how to install a card into the slot, refer to Appendix E.
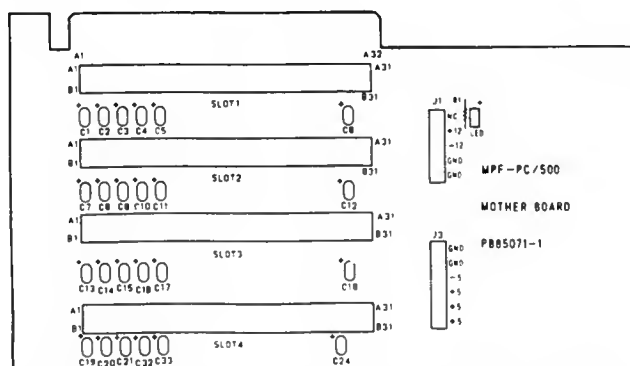
Fig. 1-12 The MotherBoard and the Expansion Slots

1.7 The Add-on Cards

As mentioned above, some cards are installed in the expansion slots, they are:

1.7.1 The CPU Card

On the CPU card are:

A. The 8088 CPU working at 4.77 MHz without coprocessor 8087.

B. ROM: 8K bytes for BIOS (U36)

C. RAM: 512K bytes, expandable to 640K without parity check

D. DMA (8237): working at 4.77 MHz

E. WAIT: I/O RW Wait 1 clock for 4.77 MHz

F. Keyboard Interface: Compatible with IBM-PC keyboard.
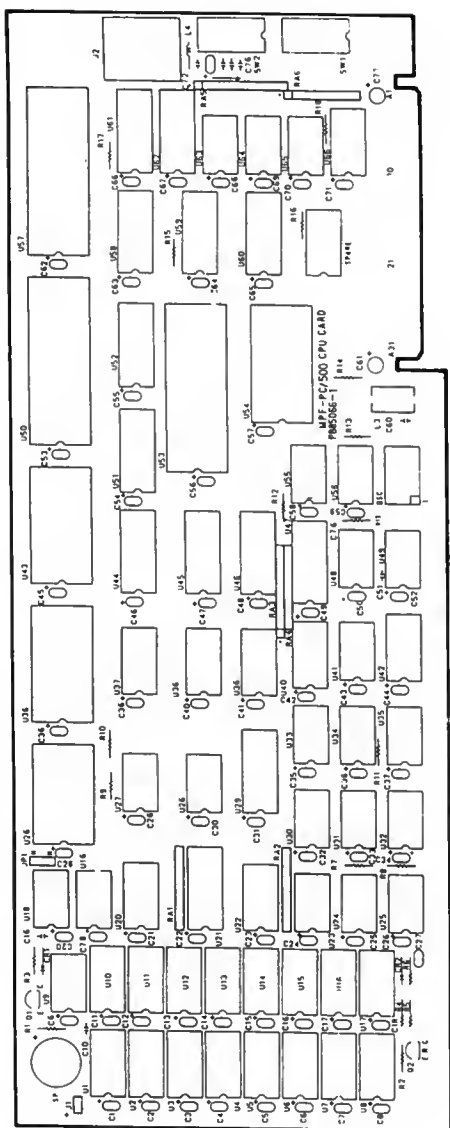
Fig. 1-13 CPU Card Block Diagram

1.7.2 The IO Board

The IO board occupies the second expansion slot from the bottom and it supports the following:

1. The FDI (Floppy Disk Interface) supports two 5-1/4" or 3-1/2" disk drivers

2. The Asynchronous Communications Interface standard EIA-232-C port (COM1 with 9-pin D-connector). Refer to Appendix B for the COM1 pin-out signals.

3. A 15-pin D-type connector game port for connecting joysticks.

4. A parallel printer interface for IBM compatible printer with 25-pin D-connector. This printer port is LPT2 (address 378H).

    If a MDA or MGA is used, the printer port on it is LPT1 (address 38CH).

    If both LPT1 and LPT2 are present, there will be no conflict, the default is LPT1 as it has a higher priority over LPT2.

5. An optional Real Time Clock (58167) with its power backed-up by a battery. The real time clock utilities are available on the system diskette, please refer to Appendix J for details on how to use them.

    An easy-to-install real time clock kit consisting of the IC 58167, a battery and 74LS174 is available from Franklin . Installation is done by plugging these items into sockets provided on the IO board marked "battery" (for the battery), U24 (for 58167) and U25 (for 74LS174). Refer to Fig. 1-14 for the locations of these sockets.
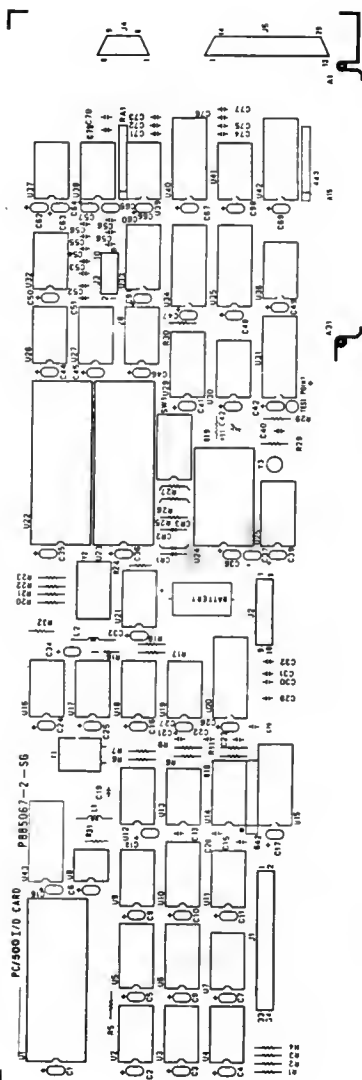
Fig. 1-14 Block Diagram of the IO Board

1.7.3 The Display Card

The standard display card included with the Franklin PC8000 is the Color Graphics Adapter (CGA) without the printer port. It is flicker-free and has a text display of of 640 x 200 pixels and 320 x 200 pixels.

The CGA-PC has a 9-pin DIN RGB signal connector and two phone jacks. With this arrangement you can either connect your monitor with a phone jack cable or with a 9-pin DIN connector.

Here is a description of each connector:

1) Color composite signal phone jack (P4).

   This phone jack connects to the video monitor which receives color composite signal input. The highest possible resolution obtained with the display monitor displaying color graphics is 320 x 200 pixels or dots.

2) B/W composite signal phone jack (P5).

   This jack is for receiving black and white composite signal input. The best resolution obtained is 640 x 200 pixels.

3) Color direct drive 9-pin connector (P6).

   Connects to the color direct drive display monitor. The highest possible resolution obtained is 640 x 200 pixels.

   The adapter also provides auxiliary video connectors for light pen and RF modulator interfaces. The light pen is interfaced via a 6-pin header and the RF modulator through the 4-pin header.

4-pin RF Modulator

6-pin Light Pen Header

RGB

B/W Composite Signal Phone Jack

Composite Video
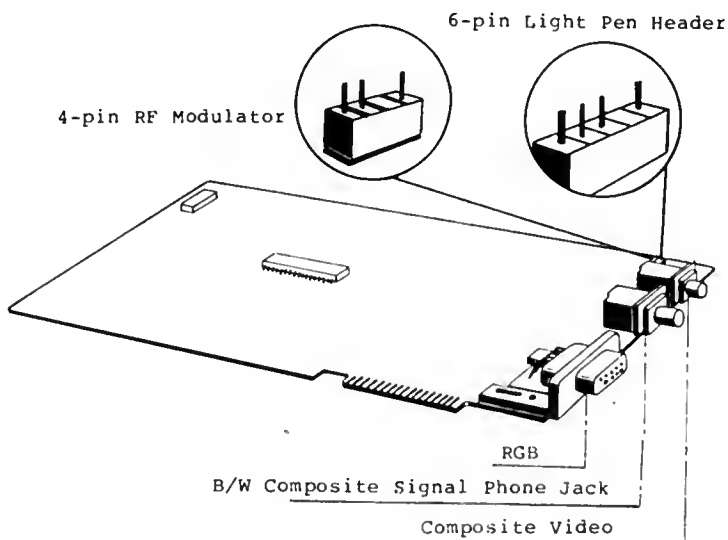
Fig. 1-15 Color Graphics Adapter

Note: If the video cable has prongs of different lengths, then the longer
        prong is to be plugged into the video phone jack.

        The adapter supports two basic operation modes — text and
        graphics. In the text mode, you can have eight pages of 40 x 25
        text or four pages of 80 x 25 text with attributes, such as reverse
        video, blinking and highlighting. In the color mode, which can
        also display text with the graphics at the same time, the color
        monitor can display up to 16 different foreground and up to
        8 background colors.

        The text mode can display the 256 character set that include 16
        special characters for games, 15 characters for editing, the 96
        ASCII set, 48 foreign language characters, 16 Greek characters
        and 15 scientific notations.

1-19

There are two resolutions available for the graphics mode. In the 320 x 200 pixels mode, the display monitor can display 320 x 200 dots of light in two sets of four colors with which to draw lines, points and figures, and 16 background colors. The 640 x 200 pixels has higher resolution and you can put on 128,000 screenful of little dots of light on the screen at one time, but it is limited to the black and white mode only.

* 40 x 25 means that there are 40 characters horizontally across the screen and 25 characters vertically down the screen. Note that spaces are also counted as characters. Under this mode, you can view 1000 characters at one time.

* 80 x 25 has 80 characters horizontally across the screen and 25 characters vertically down the screen. In this mode, one screen of text can have a maximum of 2000 characters.

The MDA and MGA cards

As mentioned earlier, a monochrome display or monochrome graphics display can also be connected to our system unit, but instead of the CGA, the Monochrome Display Adapter (MDA) or Monochrome Graphics Adapter (MGA) should be used.

Just remove the CGA and insert the MDA or MGA in its place. Refer to Appendix E on how to install add-on or expansion cards.

The MDA and MGA cards available are:

a. MDA: Text — 80 columns x 25 rows

b. MGA: Flicker-free
          Text: 80 columns x 25 rows
          Graphics: 720 x 348 pixels

1.8 The Game Port

A 15-pin game port for connecting joystick is provided as shown in Fig. 1-16.
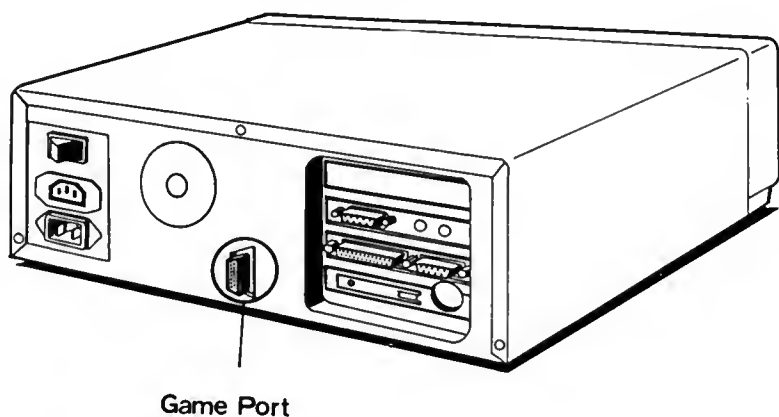
Game Port

Fig. 1-16 The Game Port

Chapter 2

Connecting Your System Unit

Now that you're familiar with the different configurations that made up your personal computer and its peripherals, we can now proceed to connect them.

2.1 Unpacking

On receiving your system unit, unpack carefully and check if the following are included:

1. The Franklin PC8000 system unit.

2. One keyboard.

3. MS-DOS system diskettes.

4. One power cord to connect the system unit to the wall outlet.

5. Manuals.

2.2 Installation Procedures

1. After unpacking, check for damages in your computer. If it is damaged, contact your local dealer.

2. Check if all the necessary components are included in the package. If not, check with your local dealer.

3. Before installing the computer, first check the power source and

the grounding. Power to the computer system should be OFF. Also check that the switches on the system unit and peripherals are off and not plugged to power outlets.

```
**********************************************************
*                                                        *
* Before making the connections, make sure that the power to *
* the computer, printer and the video display should be OFF. *
* Connecting your system while the power is on may cause per- *
* manent damages to your personal computer or peripheral *
* devices.                                                *
*                                                        *
**********************************************************
```

4. Connect the video power cable to the video power socket in the rear panel. Connect the video cable to the display card.

   Keep in mind that the display card provided with some models is the CGA-PC. For monochrome display and monochrome graphics, use a MDA or MGA and set the proper switches, refer to Appendix A for the switch settings and Appendix E on how to install the cards.
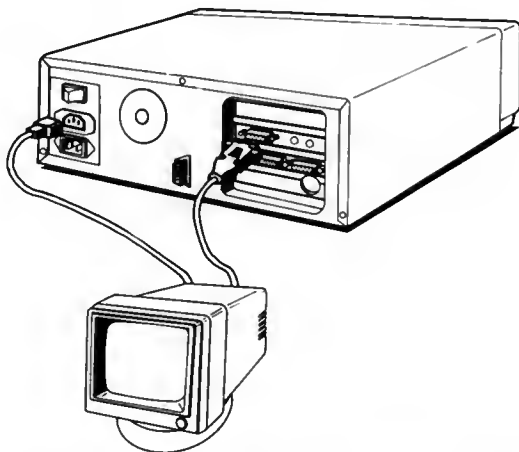
Fig. 2-1 Connecting The Monitor to System Unit

5. Connect the keyboard to the system unit. Plug the keyboard connector to the round keyboard socket as shown in Fig. 2-2.
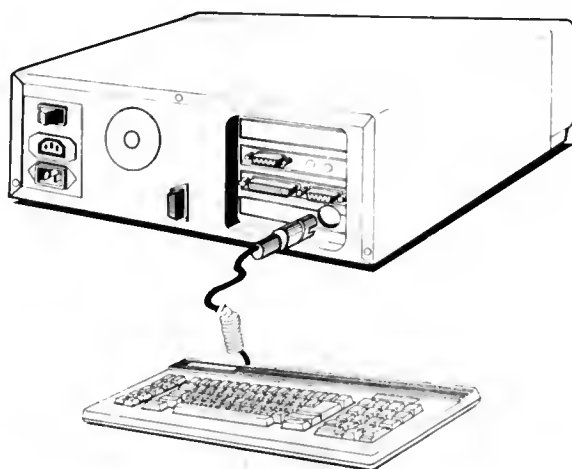
Fig. 2-2 Connecting the Keyboard to System Unit

6. Connect the printer.

   Before making the connection, read your printer manual carefully, or find out from your printer distributor what is the type of your printer. Printers are basically divided into two types — 1) Parallel (Centronics) interface printers, and 2) Serial interface (RS232) printers.

   If you have a parallel interface printer, connect your printer to the parallel printer interface connector on the system unit.

2-3

Note: Connecting a parallel printer to the serial interface will cause permanent damages to the printer or system unit, and vice versa.

Connect the power cord of the printer. One end of the power cord should be connected to the printer, and the other end to the power source.

Serial (RS-232) equipments such as modems, terminals or a host computer should be connected to the serial (RS-232) connector.
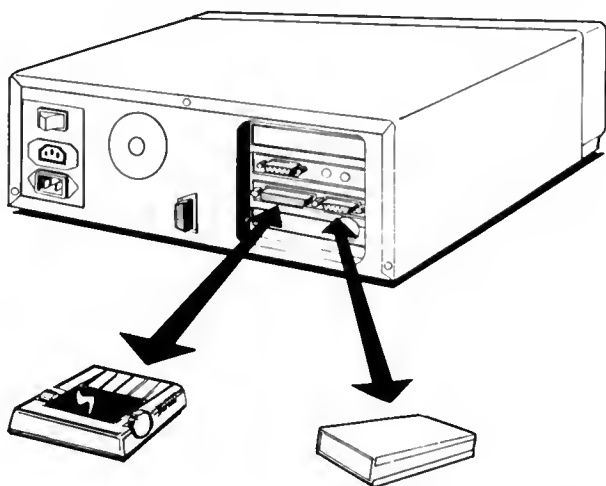
Fig. 2-3 Connecting the Parallel Printer to System Unit

7. Connect the system power cord. One end of the power cord should be connected to the system unit, while the other end should be connected to the power source.

8. The system unit should be connected as follows:
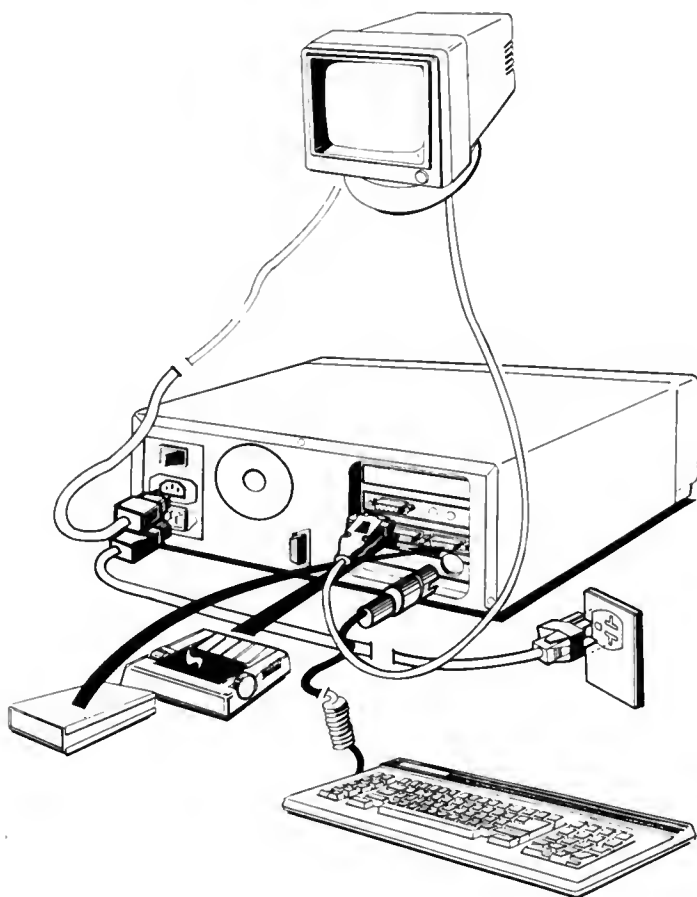
Fig. 2-4 Proper Installation of the Syste n Unit

Chapter 3

Power On Your System

After setting up or connecting your system, the next thing to do is to turn on the power and you're on your way to having fun with your computer.

Before we proceed on how to power on the system, here are some helpful pointers on proper diskette management to let your computer perform without a hitch.

3.1 Write-Protect Your Diskettes

The first thing you should do on receiving the MS-DOS system diskette is to write-protect it. Put a tab on the write-protect notch if it is not already protected. See Fig. 3-1.

PROTECTION NOTCH

INDEX HOLE

HEAD APERTURE
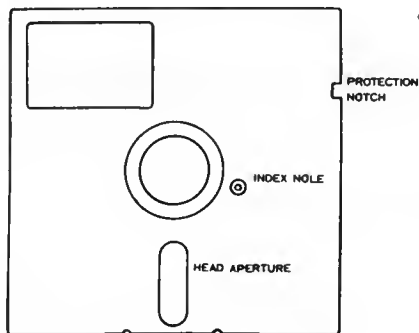
Fig. 3-1 Floppy Diskette

3.2 Make a Back-up Copy

The MS-DOS diskette is not copy-protected and a good precaution is to make a back-up copy from the original. Details on how to format and copy a diskette can be found in Chapter 5 of this manual. Store the original in a safe place and use the back-up as your working diskette. This will prevent inadvertent writing or in case of loss, you can make another back up with the original.

3.3 Diskette Handling

1. Under no circumstance should the exposed portion of the head aperture be touched, scratched, or left in the open for dust to collect.

2. Extreme temperatures should also be avoided. The ambient temperature should be around 45 to 85 degrees Fahrenheit (8 to 30 degrees Celsius)

3. When the diskette is removed from the diskette drive, it must be returned into the protective envelope immediately.

4. Do not bent, throw or write on the diskette with anything harder than a felt pen.

5. Diskettes should be kept far away from devices that generate magnetic fields, such as a fan.

6. Do not remove the diskette from the drive when the red in-use light is on. Sometimes, when the disk drive head can not read a diskette because it is damaged, the in-use light will not go off, just turn off the computer before removing the diskette.

3.4 Tracks and Sectors

The diskette is enclosed in a protective jacket in which it revolves as data on it are being read by the magnetic head. The smooth magnetic surface that you see on the head aperture is the area on which informa-

tion is written to or read from.

Before the diskette can be written to, it must be formatted first. This is done by writing tracks on it. The diskette drive(s) can format 40 tracks on each side, or a total of 80 tracks numbered 0 to 79. A track is divided into sectors. Normally, eight or nine sectors are present on each track. The sector that contains 256 bytes of information is referred to as a single-density diskette, while the sector that is 512 bytes long is a double-density diskette. This computer can only use double-density diskettes. Instructions on how to format the diskette will be given in Chapter 5.

3.5 Single Sided or Double Sided Diskette

A diskette is either single or double sided. If only one side is used for storage, it is called single sided. If both sides are used, it is then called double sided.

3.6 Soft and Hard Sectored Diskette

The diskette has one or more holes punched into it as reference for the diskette drive mechanism in locating a specific track or sector. The diskette that has a hole between sectors is called a hard sectored diskette. The diskette with only one hole is soft sectored. This computer uses soft sectored diskettes.

3.7 Inserting Diskette in Drive

Hold the diskette lightly between the thumb and the first finger near the label. With the label side up, insert the MS-DOS system diskette gently into the disk drive until it is seated properly in the drive. Turn on the power of the system unit. Turn the lever clockwise to close the drive door. See Fig. 3-2.
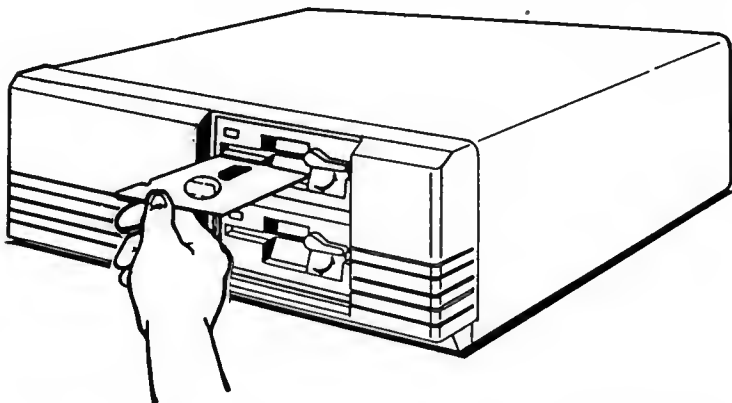
Fig. 3-2 Inserting a Diskette

3.8 Booting Your System

The process of bringing up a system is called loading or booting a system. Sometimes, an operating system loads automatically into the system memory, this process is called boot strap loading.

When power is turned on, the speaker inside the system unit will beep, and a self-test is performed to check that the CPU, ROM, RAM, keyboard, etc. are connected and functioning properly. When the self-test is completed and no error is detected, it will proceed to boot the system from the diskette.

1. Turn power on.

2. Insert the MS-DOS diskette and turn the lever on the disk drive clockwise. The screen will then display a self-test message:

```
*** SELF-TEST ***

RAM  TEST  (Y/N) ?

.RAM  SIZE  (K)
```
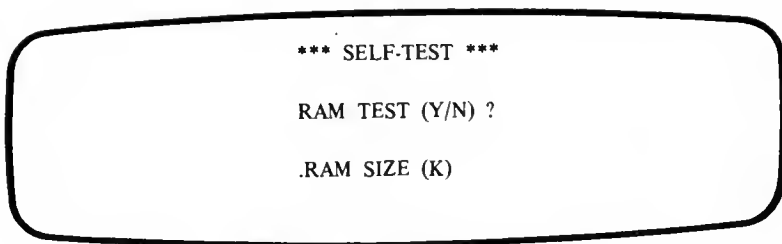
Fig. 3-3 Self-Test Message

Each time you power up the computer, the system checks the RAM
on the system board or on the memory expansion board for damages.
However, checking every byte of the RAM memory takes some time,
therefore, we give you the choice of checking the RAM memory slowly
or fast.

Note that upon being prompted with the above message "RAM TEST
(Y/N) ?", if you respond to the question with a Y for Yes, then the
system will check all the RAM memory on the system board byte
by byte and successively display a corresponding position number of
the memory after every 1k bytes of memory has been checked. This
operation takes about half minute.

If you responded with N for No or just ignore it, the system will use
the fast way to check all the RAM memory on the system board 64K
bytes by 64K bytes.

If there is an error, an error message will be displayed on the screen.
Refer to the appendix on error messages for explanations.

After booting the system successfully, the speaker will give another
beep, and the following will be displayed on the screen:

```
Current date is Tue 1-01-1980
Enter new date (mm-dd-yy)
Current time is 0:00:29.87
Enter new time:


Microsoft(R) MS-DOS(R)   Version x.xx
            (C) Copyright Microsoft Corp 1981-1986

A>
```
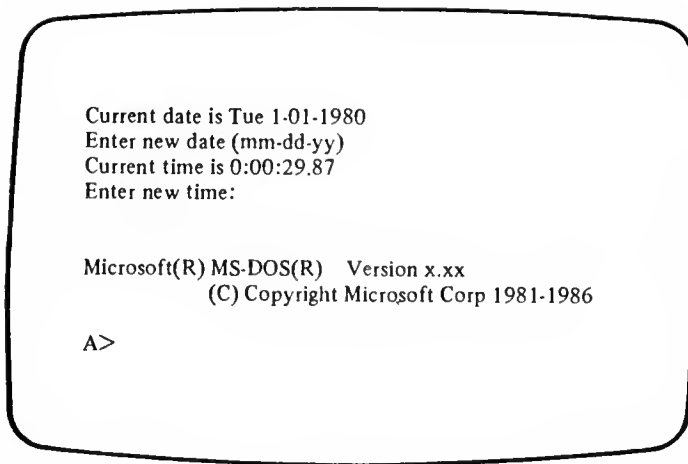
Fig. 3-4 MS-DOS Screen Message

After "Enter new date:" you will see the blinking cursor. Press the
Enter key or enter the new date in this format:

mm/dd/yy or mm-dd-yy

Example:

3/25/85 or 3-25-85 or 03/25/85 or 03-25-85 are all acceptable.

Then, you will see the following message:

```
Current time is 0:00:29.87
Enter new time: _
```

The above time is zero hour, zero minutes and 29.87 seconds. Again, you may either ignore it and hit the Enter key or enter the new time in this format:

hh:mm:ss.xx

Where   *hh*   *is the hour and can be any number from 0-23.*
           mm   *is the minute and can be any number from 0-59.*
           ss   *is the second and can be any number from 0-59.*
           xx   *is hundredths of a second and can be any number*
                   from 0-99. This field is optional.

The colon is used to separate the hour, minute and seconds. To separate the second from hundredths of second, use the period. The system uses a 24-hour system, so if the current time is 8.30 p.m., type in the current time like this:

20:30:00

Next, the MS-DOS version line will be shown followed by the copyright line and finally, the MS-DOS prompt "A>" will appear on the screen. You can now enter any MS-DOS commands to do specific tasks.

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Chapter 4

Keyboard Usage

The keyboard serves one of the most important functions in a computer system, without it, direct communication between the computer and the user will be impossible.

By using the keyboard, the user can key in a command directly and have it executed, enter data and store them in the diskette, or simply "echo" data entered on the screen.

Characters entered are displayed immediately on the screen at the same time they are sent to be processed.

There are 84 keys on our keyboard. These keys are divided into three groups: 1) the main keyboard, 2) the numeric key pad, and 3) the function keys.

4.1 The Main Keyboard
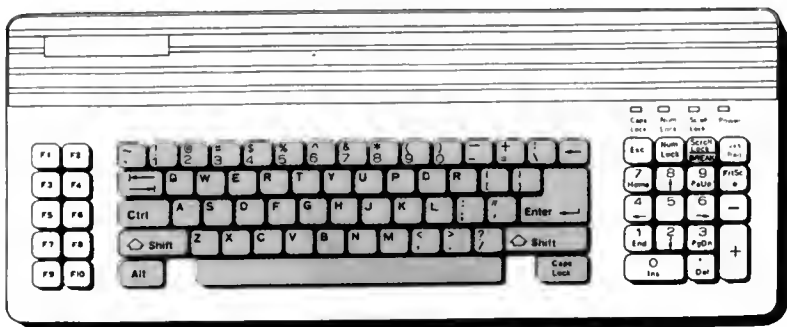
Fig. 4-1 The Main Keyboard

4-1

The main keyboard is similar to an ordinary typewriter keyboard. It is used mainly to enter alphabets from A to Z, numeric digits from 0 to 9, and special signs and punctuation marks such as:

```
!  @  #  $  %  ^  &  *  ( )  — -  + =
[ ]          :  ;  '  "  ñ  `
|  \  < >  '  .  ?  /
```

Once a key is pressed, its corresponding character will be displayed on your video monitor. In this case, we say the pressed key is "echoed" on the screen in computer terminology.

4.1.1 The Shift Key
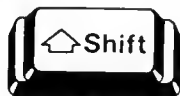
Fig. 4-2 The Shift Key

The main keyboard may be used to enter both upper and lower case characters.   On an ordinary typewriter keyboard, pressing the Shift key and any key will produce an upper case character of that key. By the same token, to type an upper case character using this keyboard, press the desired key while holding down the Shift key.   The Shift key is always used together with another key.

4.1.2 The Ctrl (Control) Key
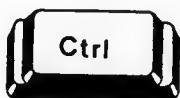
Fig. 4-3 The Ctrl Key

The control key, which is marked "Ctrl", is another kind of shift key and is also used in conjunction with other keys on the keyboard. Normally, the Ctrl key is used together with other key(s) to generate an internal code for a special function that the system understands.

4.1.3 The Alt (Alternate) Key

Fig. 4-4 The Alt Key

The Alt key is a third kind of shift key and is also used in conjunction with other key(s) to perform a special function.

4.1.4 The Caps Lock Key

Fig. 4-5 The Caps Lock Key

This key is located on the lower right corner of the main keyboard. This key functions as an on/off (toggle) switch for shifting from capital letters to small letters.

Pressing this key once will lock your keyboard to the capital-letter-only mode. After locking the keyboard to the capital-letter-only mode,

4-3

all the keys pressed will be echoed in upper case letters on the video monitor. Pressing it again will return your keyboard to the lowercase mode.

4.1.5 The Enter Key

Fig. 4-6 The Enter Key

This is the Enter key. It is equivalent to the typewriter's carriage return. When the Enter key is pressed, the cursor will move to the beginning of the next line.

4.1.6 The Backspace Key

Fig. 4-7 The Backspace Key

Pressing the Backspace key will move the cursor one character to the left of its current position, at the same time deleting the character from the position it has moved from.

4.1.7 The Tab Key

Fig. 4-8 The Tab Key

The Tab key shifts the cursor eight spaces to the right at each press. However, it cannot cause the cursor to tab to the left.

4.1.8 The Space Bar
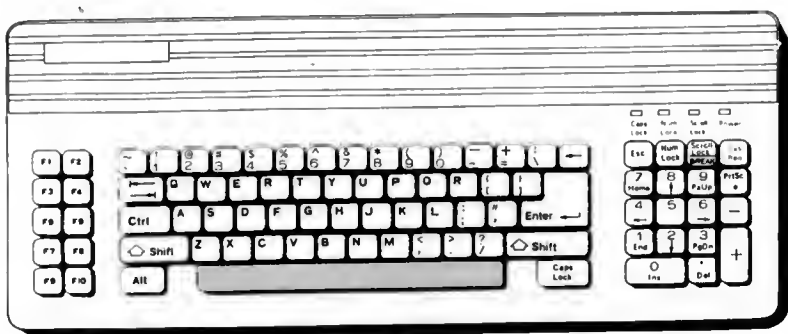
Fig. 4-9 The Space Bar

The Space bar is located at the bottom of the main keyboard. This key is used for producing spaces.

4.2 The Numeric KeyPad
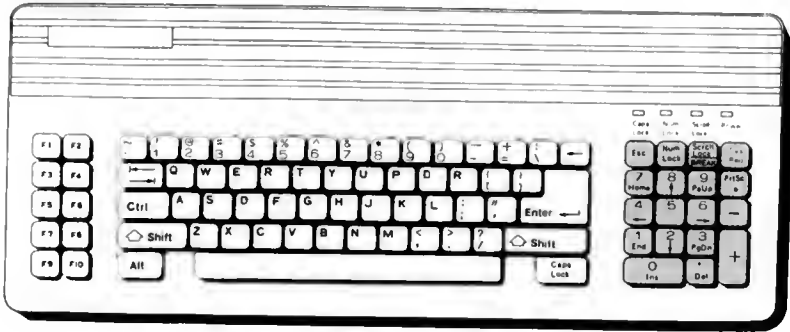
Fig. 4-10 The Numeric Keypad

On the right side of the keyboard is the numeric keypad as shown
by the shaded keys in Fig. 4-10. These keys have two specific functions.
They are either in the numeric or cursor-control mode.

When it is in the numeric mode, the keys in this area are used for
entering numerals.   This is rather convenient for entering long string
of numeric data.

The default is cursor-control mode.   This means that upon power on,
the keys on the numeric keypad will be used to shift the cursor one
space to any of the four directions as indicated by the respective keys.

To enter the numeric mode, press the Num Lock key once.   Pressing
the "Num Lock" key for a second time disables the numeric mode.

4.3 The Function Keys Under the MS-DOS
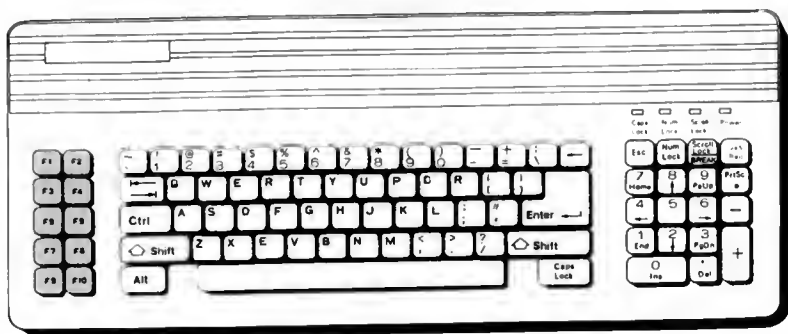
Fig. 4-11 The Function Keys

Under MS-DOS, the first five function keys are used mainly for editing. Their functions are:

4.3.1   F1

F1 is used for displaying one character from the template each time you enter this key. The same results can be achieved by using the right direction arrow key ("6" on the numeric keypad).

For example, type "Personal Computer" from the keyboard and hit F5 to enter the characters into the template. Press the F1 key 17 times and all the characters, one character at a time from left to right, will be displayed.

4.3.2   F2

Press   F2 and a character will display all the characters preceding that character from the template. The specified character and the succeeding characters will not be displayed.

For example, pressing F2 and then "C" will immediately display "Personal" on the screen.

4.3.3   F3
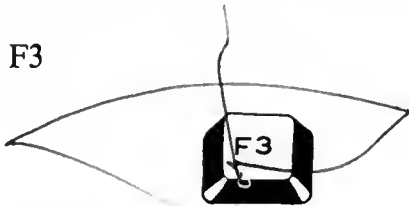
Pressing F3 will copy all the characters from the template to the screen.

4.3.4   F4

This key will delete all the characters preceding a specified character.

Let's continue with the above example. Enter "Personal Computer" and press F5. Press F4 and "C". Nothing seems to have happened. Don't worry. Now press F3 and "Computer" will be shown on the screen. The characters preceeding the "C" in "Computer" have been deleted.

4.3.5 F5

Pressing F5 will send all the keyed in characters to the template without sending them to the computer for processing.

For example, after the MS-DOS prompt > appears, enter "Franklin Personal Computer" and press F5, a "@" will be displayed at the end of the line and the cursor will move to the beginning of the next line. Now enter the key F3, all the characters that you just typed into the template will be displayed.

4.4 Other Editing Keys

Aside from the five function keys, there are three more keys that are used for MS-DOS editing. They are the "Del", "Ins" and "Esc" keys on the numeric keypad.

4.4.1 Ins

Ins will insert characters anywhere in the line. The "Ins" key is located at the bottom of the numeric keypad.

For example, key in "Personal Computer". Press F5 to enter these characters into the template. Press F1 until "Personal" is displayed on the screen. Press "Ins" key once and key in "micro". Now press the "Ins" key again to exit from the insert mode. Press F3 and "Personal microcomputer" will be shown on the screen.

4-9

4.4.2 Del

The Del key deletes characters (to the right of the cursor position) from the template without moving the cursor position on the screen. It is located at the bottom of the numeric keypad.

Using the above example, press F1 until "Personal" appears on the screen. Press the Del key five times (to delete "micro") before pressing F3. Now "Personal computer" will be shown on the screen.

4.4.3 Esc

The Esc key will cancel the current line on the screen. However, the characters in the template remain unchanged.

While "Personal computer" is being displayed, press the "Esc" key. The cursor will move to the next line. You can either enter new data and press the Return key to remove the previous data from the template, or you can press F3 to redisplay "Personal computer".

4.5 Program Control Keys in BASIC (Option)

If you added the BASIC interpreter to your computer, the function keys can be used to execute certain frequently used BASIC commands.

This is very convenient considering that with one keystroke, a command can be entered immediately without any typing errors.

If you are in the 40-column display mode, then only the first five BASIC commands that are assigned will be displayed, nevertheless all the 10 commands assigned to the function keys are still operative. To view all ten commands at the same time, the 80-column display mode is necessary.

Note that in either display mode, only the first six characters of each command will be displayed although each command can be 1 — 15 characters long. Since these function keys are user-definable, they are called "soft keys".

Here is a sample program on now to change the command of F1 (which is assigned the command "LIST" when BASIC is loaded) to "EDIT":

        10 rem Redefine F1 to edit
        20 F1, "Edit"

Enter and run this program. Until you turn the power off on your computer or redefine F1, whenever you press this key, "Edit" will be entered on the screen instead of "LIST". The new command is also entered and displayed on the status line at the bottom of the screen.

A complete list of the function keys with their default commands is given below:

4.5.1   F1   LIST

Pressing F1 and the Return key will LIST the entire program on the screen. If the program is too long to be held on the screen at one time for viewing, the listing can be paused by hitting the "Ctrl" and "Num Lock" keys together. To resume listing, strike any key.

After entering F1, you can add parameters before pressing the Return key as shown by the following examples:

1. **LIST 10**

   Press F1 and when "List" is displayed on the screen, type "10" and press the Return key. This will list only program line No. 10.

2. **LIST 50 −**

   This command line will list all program lines beginning from line No. 50 to the end of the program. The lines preceding line No. 50 will be skipped and will not be listed on the screen. The other program lines residing in memory are not affected and can be listed in its entirety by entering LIST without adding parameters after the command.

3. **LIST − 80**

   This command line will list all program lines right from the beginning up to and including line No. 80, and if there are any other program lines after line No. 80, they will not be displayed on the screen. However all the other program lines in memory are not affected.

4.5.2   F2   RUN

This is the RUN< key.   After a program is entered, pressing this key will cause the execution of the program from the beginning.

You will notice that there is a left direction arrow after the word "RUN".   This denotes that on typing F2, the command will be executed immediately without having to hit the Return key as in the LIST command.   It is assumed that without this arrow indicator after the command, it is necessary to hit the Return key to execute the command.

4.5.3   F3   LOAD"

Pressing F3 and entering the name of a BASIC file that was already saved on the disk will cause the computer to load that particular file from the disk into the computer memory.

4.5.4   F4   SAVE

After writing a program, it can be SAVEd on a disk or other types of auxiliary storage. All you have to do is enter this key, a unique filename and hit enter.

For example, SAVE"B:PRG2.BAS", will have the program PRG2 saved in drive B if your default drive is A.

4.5.5   F5   CONT

CONT (short for continue) will restart a program starting from the remaining segment of the unexecuted portion of a program that has been interrupted with CTRL+BREAK or the STOP command.

4.5.6   F6   LPT1

This function key prints out "LPT1:" on the screen. LPT1 is for line printer one.   This command must be used together with another command, e.g.: LIST, "LPT1:" will have the complete program listed on the printer.

4.5.7   F7   TRON

TRON stands for trace on. Running a program with TRON will list each line number as the program is being executed.   It is normally used to "trace" a mistake in a program that is interferring with its correct execution.

4.5.8   F8   TROFF

TROFF (trace off) disables TRON.

4.5.9   F9   KEY

This KEY is used to reassign a different command or string to any of the ten function keys.

For example, type KEY 5,"system"+chr$(13) will return you to DOS from BASIC each time you hit the F5 key.

4.5.10   F10   SCREEN 0,0,0

The SCREEN command is used for returning to the text mode from the graphics mode. Under the low-resolution graphics mode (SCREEN 1), F10 will return you to a screen width of 40 characters. If under the high-resolution graphics mode (SCREEN 2), it will return to the 80-character text mode.

4.5.11   Home

Pressing the Home key while holding down the Ctrl key will clear the screen and send the cursor to the upper left corner of the screen. However your program in memory is not intact.

4.5.12 End

This key will move the cursor to the end of the current data line.

4.5.13 Del

Hitting the Del key under the cursor-control mode will delete the character on the cursor position and move the remaining characters on the right of the cursor one space to the left. Press the Enter key after hitting this key.

4.5.14 Ins

Press this key once to enter the insert mode. To enter the insert mode, the numeric keypad must be in the cursor-control function mode. While in this mode, character(s) can be inserted into the cursor position, shifting all other characters right of the cursor one or more spaces to the right. Press the "Ins" key again to exit from the insert mode. As with the Del key, it is necessary to hit the Return key after inserting character(s) in each line.

4.5.15 Ctrl + ←

Pressing the "Ctrl" key together with the left direction arrow key will shift the cursor one word (not character) to the left.

4.5.16 Ctrl + →

This combination causes the cursor to shift one word to the right.

4.5.17 Ctrl + Scroll Lock/Break

Whenever you need to stop a program execution for whatever reason, press the Scroll Lock/Break key while holding down the Ctrl key. This will stop the program completely, and there is no way to continue with its execution from where it was interrupted except to start from the beginning. A better method is to use the Ctrl + Num Lock keys so that you may CONTinue with the program from where it was interrupted.

Chapter 5

Learning the MS-DOS Operating System

An operating system is a set of interrelated programs designed to manage and control functions over processing in a computer system.

The operating system provided in our package is the MS-DOS by MicroSoft, currently one of the most popular disk operating systems for personal computers.

In this chapter, we'll show you how to run the most commonly used MS-DOS commands such as FORMAT, COPY, DISKCOPY,, etc. using a single disk drive.

For detailed information on the MS-DOS, its commands and their functions, please refer to the "MS-DOS Operating System User's Guide".

5.1 Learning About Your Files

Under MS-DOS, a filename is made up of one to eight characters. The characters allowed can be any of the following:

- Alphabets A through Z
- Numbers 0 through 9
- Special characters !, @, #, $, %, &, (,), −, _, ', `, ´

Note that the first character of the filename must be an alphabet.

A filename is sometimes followed by a filename extension. The filename extention which comes immediately after the filename can be one to three characters but it must always be preceeded by a period.

When global filename characters are used as file specifications, a group of files can be accessed or processed at one time. The global filename characters are sometimes referred to as wildcard characters.

Two global filename characters are used for file specifications — "?" and "*".

When a "?" is used as file specification (it does not matter whether it is used as part of a filename or a filename extension), it means that any character can occupy that position. In other words, when a "?" is embedded in a filename or filename extension, it holds one byte of information which can be used for a filename and filename extension.

A file specification of ab?.bas could mean the files:

                    ab1.bas
                    ab2.bas
                    abx.bas
                    aby.bas
                    ab%.bas
                    ab&.bas
                       .
                       .
                       .

A "*" is used to represent eight bytes of information that can be used as file specifications. In other words, when a "*" is included in a filename or file extention, it means that any allowable file specification characters can occupy that position or any of the remaining positions in the filename and its extension. For example, a file specification "*.*" can mean any one of the following filenames and their extensions:

XXXXXXXX.XXX
xxxyyyzz.abc
a1234567.bas
b%!@zxy&.int
SALARY.BAS

.

.

.

The global characters "?" and "*" can be used together in a global file specification. For example, the file specification "ab?.*" can refer to any of the following files:

ab1.bak
ab2.bas
abx.int
aby.com

.

.

.

The use of global filename characters allows a group of files to be processed with one command line.

For example, entering a global file specification following the COPY command will cause a group of files to be copied.

If you enter the global file specification "ab?.*" following the COPY command, then all the files which match this file specification will be copied. If you enter the global file specification "*.*" following the COPY command, then all the files from the default drive are copied onto the destination drive without changing the file specifications.

Below are some of the most commonly used MS-DOS commands:

5.2 Formatting A Diskette with One Drive

As mentioned earlier, a diskette that has not been formatted cannot be used because there are no sectors or tracks on which information

can be written.

1. Insert the MS-DOS diskette into the disk drive.

2. When the prompt appears, key in:

   A>Format a:/s   and press the [Enter] key

   This message will be displayed:

   ```
          Insert new diskette for drive A:
          and strike ENTER when ready
   ```

   When the red in-use light is off, remove the MS-DOS diskette and insert the new diskette in its place.
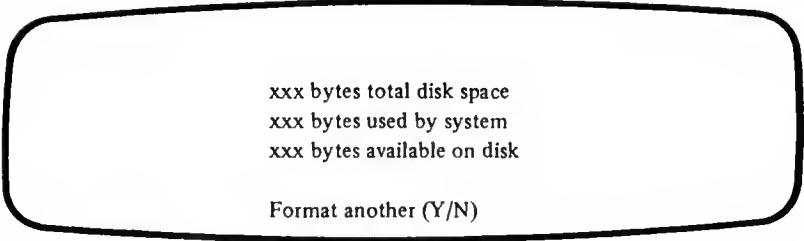
   Hit any key and the following message will be shown:

   ```
          Heads: n    Cylinder: nn
   ```

   telling you the head and cylinder number that are being formatted.

When formatting is complete, the following messages are displayed:

```
        xxx bytes total disk space
        xxx bytes used by system
        xxx bytes available on disk

        Format another (Y/N)
```

To continue formatting another diskette, remove the newly formatted diskette and insert a blank diskette in its place, then press "y" or "Y". Continue this step until you have the desired number of formatted diskettes.

Enter "n" or "N" if you don't want to format another diskette.

The format of the FORMAT command is:

[d:] [path] FORMAT [d:] [/S] [/1] [/8] [/V] [/B] [/4]

[d:] [path] is the drive and path that contains FORMAT.

[d:] specifies the drive containing the disk that need to be formatted. If no drive is specified, the disk in the default drive is formatted.

If the /s switch is specified, then FORMAT copies the operating system files from the disk in the default drive to the newly formatted disk. The files are copied in the following order:

    IO.SYS   (hidden file)
    MSDOS.SYS   (hidden file)
    COMMAND.COM

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5.3 Backing Up Your System Diskette

There are two ways to back up your MS-DOS system diskette or any other diskette. You can either use the COPY or the DISKCOPY command.

The diskette that contains the files from which it is to be copied is called the source diskette, and the individual file(s) on it are called the source file(s). The diskette to which the files are to be copied to is called the target or destination diskette, or back up.

5.3.1 The COPY Command

The COPY command is a very versatile command and there are four ways in which files can be copied:

1) A file or all the files in a diskette may be copied to another diskette with the same name(s) and extension(s). This specific command will have all files rearranged in the new diskette to make optimum use of the disk space.

    a.) Copy all the files from the source diskette in a: to the target diskette in b:.

        >copy a:*.* b:

All the files in the source diskette will be copied to the target diskette will be copied to the target diskette with the same filenames and filename extensions.

    b.) copy a file from a: to b: using the same filename:

        >copy a: file1 b:

2) A file may be copied to another diskette with a different filename:

        >copy a: file1 b: file2

3) A file may be copied to the same diskette but using a different filename. This will create two identical files on the same diskette but with different names:

>copy file1 file2

Note: There is no need to specify the drive numbers since both files are on the same diskette.

4) Overwriting the contents of an existing file with the contents of another file. The other file may be from: 1) another diskette but with the same filename, 2) another diskette but with a different filename, or 3) the same diskette but with a different filename.

The existing file will be completely overwritten and unrecoverable

The syntax of the COPY command is:

>COPY   filename.extension   [filename[.extension]] [/V]

The first filename is the source filename, while the second filename is the optional target filename. If the target filename is not given, it will be assigned the same filename as the source file.
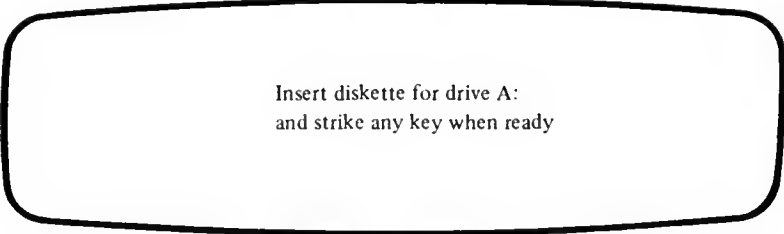
After copying file(s), the parameter "/V" will verify that the files are correctly copied.

Copying All the Files from One Diskette to Another

1. Insert the source diskette in drive a:

2. Key in:

A>COPY *.* b: press the [Enter] key.
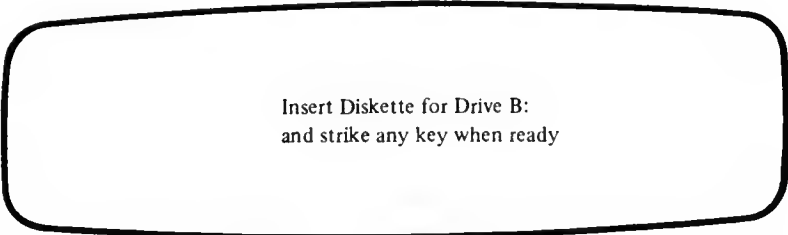
3.   The following message will appear:

Insert diskette for drive A:
and strike any key when ready
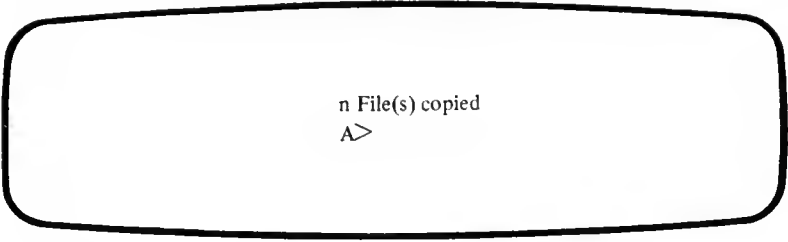
Since the diskette is already inserted just strike any key.

4.   Then the screen will display the following message:

Insert Diskette for Drive B:
and strike any key when ready

5.   After the files are copied, the screen will display:

```
                      n File(s) copied
                      A>
```

This message will always appear whenever you have successfully copied a file. "n" stand for the number of files.

Copy a File from One Diskette to Another With the Same Filename

1) Insert the source diskette in drive A.

2) If you filename is called "PROGRAM.EXE", type in:

A>copy program.exe b: press the Enter key

3) Insert the proper diskettes as prompted.

If you want a new filename for the destination file, then enter:

A>copy program.exe b: prog.exe

Copy a File to the Currently Logged Diskette With a Different Filename

1) Insert the source diskette in drive A.

2) Enter the following command:

A>copy program.exe new_prog.exe

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Now you have two identical files on the same diskette, one is called "PROGRAM.EXE" and the other is called "NEW_PROG.EXE". Note that the source filename and the destination filename must be separated by a space.

Copy a File to Another That Already Exists on the Source Diskette

To replace the contents of an existing file with the contents of another file, key in:

A>copy program.exe pro.exe

After executing this command, the contents of pro-exe are overwritten with the contents of the program.exe file.
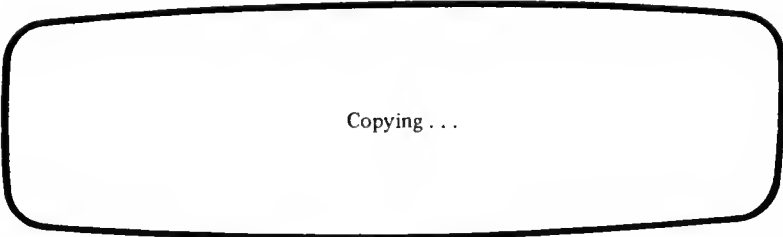
The previous contents of the pro.exe are lost and unrecoverable

5.3.2 The DISKCOPY Command

The MS-DOS provides a DISKCOPY program on the system diskette which allows you to copy all the files from the source diskette to the target diskette.
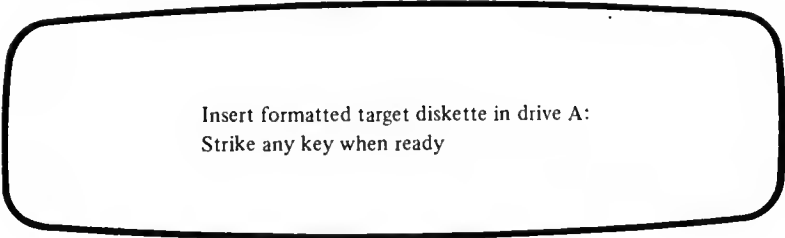
1) Insert the source diskette in the top disk drive, and the target diskette in the bottom drive

2) Enter the command:

A>diskcopy Press the [Enter] key

3) The user will be prompted to insert the diskettes at the appropriate times if there is only one drive in the system. Press any key to inform MS-DOS that the diskettes have been inserted.

4) Copying starts and while it is going on, the following message is shown:
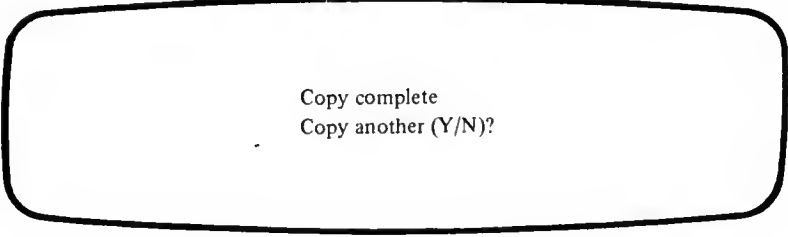
```
                        Copying . . .
```

If the destination diskette is not formatted, then the user will be prompted with the following screen message:

```
        Insert formatted target diskette in drive A:
        Strike any key when ready
```

5) After the MS-DOS has completed copying, the screen will show:

```
            Copy complete
            Copy another (Y/N)?
```

Press "Y" if you want to continue copying a diskette. Otherwise, press "N" to exit from the DISKCOPY program and return the control to MS-DOS.

5.4 The DIR Command

The DIR command gives the user a list of the files or a specific file in the current directory on a diskette.

The DIR command will print a list of the filenames, filename extentions, the size of the files, the time and the date when the when the files were last accessed.

The syntax of the DIR command is:

A>DIR [filename]

Note that the filename is optional. If no filename is given, then DIR will list the whole directory.

Example 1:

A>DIR   press the Enter key

The screen will show the filenames, file extentions, the sizes of each files, the time and date the files were last accessed. After all the file information has been listed, the MS-DOS will print the size of unused memory space on the diskette.

The file information is printed on the screen line by line.

Example 2:

A>dir Debug.com   press the Enter key

The filename and extension Debug.com, size of file, last accessed time and date, and the free memory space left on the diskette are displayed.

If Debug.com is not found on the diskette, the following message will be displayed:

```
File not found
```

5.5   The TYPE Command

The TYPE command will print out the contents of a file on the screen.

The command syntax is:

   A>type filename.ext

5.6   The RENAME Command

The RENAME command lets you change the file name of an existing file.

The command systax is:

   A> rename oldname.ext newname.ext

                   or

   A> ren oldname.ext newname.ext

Note that the old filename (the file to be renamed) comes before the new filename in the command line and they are separated by a space.

Also note that the new filename should not be an existing filename in the same diskette.

5.7 The ERASE Command

The ERASE command is used to delete the file specified in the command line.

The ERASE command is the equivalent to the DEL command. The DEL is also used to erase (delete) a file.

The command syntax is:

>Erase filename

or

>Del filename

When the global filename *.* is specified, all the files on the diskette will be erased.

Appendix A

On-board Switch Setting

A.1 Configuration Switch Settings

There is a DIP (Dual In-line Package) switch on the CPU card designated as SWI. On this switch are eight slide switches that can be set to "ON" or "OFF" using a pin or toothpick.

The switch is adjusted so that the microprocessor can access the devices connected directly or indirectly to it, e.g., the RAM (Random Access Memory) and peripheral devices that are connected to or installed in your system unit.

A.2 The Location of the DIP Switche

The switch is positioned conveniently in the rear panel in such a way that it can be accessed without having to remove the housing from the system unit.

Remove the metal strip on the CPU Board by loosening the screw as shown in Fig. A-1. The DIP switch is then visible.

A-1

The locations of the two switches are shown in the following illustration:
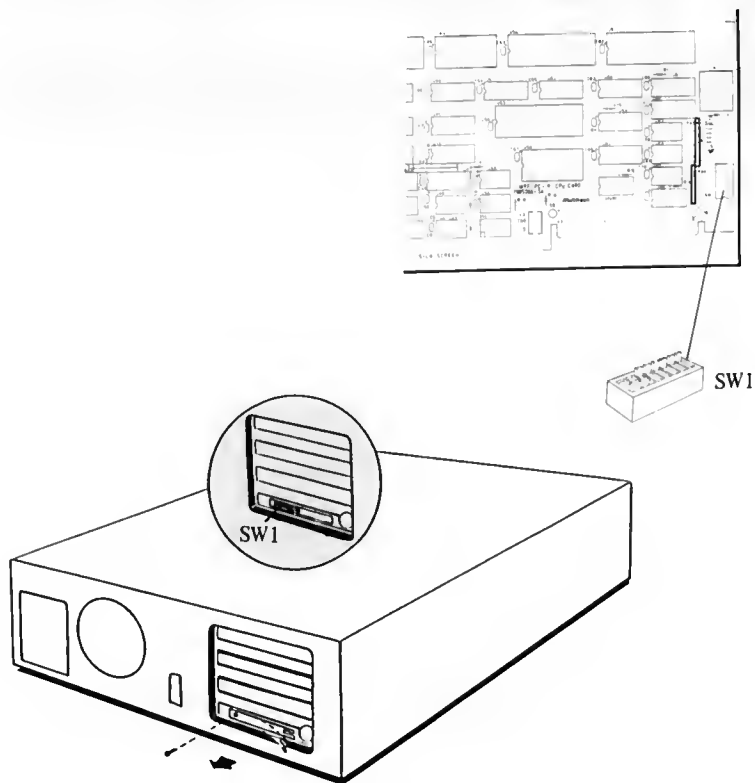
Fig. A-1 Location of the DIP Switches

To operate your system properly, SW1 should be set properly. The following is a summary of the function of each slide switch. The summary provides you with an overview of the functions of the configuration switch.

A-2

A.3 Descriptions of the DIP Switch

A.3.1 SW1 — DIP Switch One

Switch No.	Function
SW1-1	Enables disk drive.
SW1-2	Unused
SW1-3	Reserved
SW1-4	Reserved
SW1-5	Determines the number of display columns.
SW1-6	Determines display type.
SW1-7	SW1-7 and SW1-8 determine the number
SW1-8	of disk drive(s) installed in the system unit.

A.4 Default Switch Settings

A.4.1 SW1 — DIP Switch One

Switch No.	Default Setting	
SW1-1	OFF	Disk drive enabled.
SW1-2	*	Unused
SW1-3	OFF	Reserved
SW1-4	OFF	Reserved
SW1-5	ON	Default display type is CGA and display is 80 characters by 25 lines.
SW1-6	OFF	
SW1-7	ON	Default number of drives is 1
SW1-8	ON	.

A.5 How to Set the Switches

We strongly recommend that all switch positions be noted down before attempting to adjust any of the switches (so that you can reset them to their original positions if necessary).

A.5.1 Switch No. 1 — SW1

SW1-1   The normal position of this slide switch is OFF. This will load the operating system from the floppy disk drive to the system memory upon system power on. If it is ON, the diskette drive(s) will be deactivated, and the system cannot be booted even if you have diskette drive(s) installed and operating system program inserted in your diskette drive.

SW1-5   The video display type is determined by SW1-5 and SW1-6. Be forewarned that setting the slide switches for the display monitor differently from those given in this manual may damage your display. For monochrome display monitor, this slide switch should be set to OFF. For color display monitor having 40 characters per line, it should also be set to OFF. Refer to the following figures for the correct switch settings. Set this switch to ON if the Enhanced Graphics Adapter is installed.

SW1-6   This slide switch should be set to OFF for monochrome display. For color monitor with 40 characters mode, it should be ON. Refer to the following figures for the correct settings. Set this switch to ON if the Enhanced Graphics Adapter is installed.
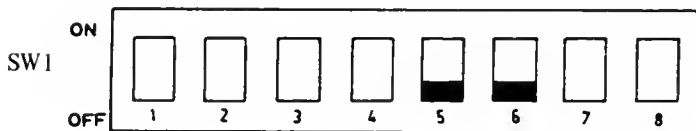
Fig. A-2 Switch Setting for Monochrome Display 80 x 25
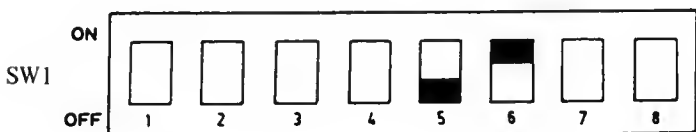
Fig. A-3 Switch Setting for Color Card 40 x 25
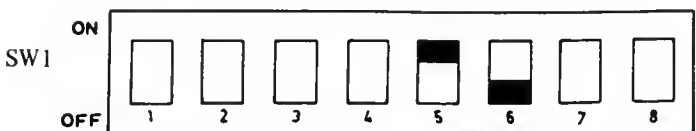
Fig. A-4 Switch Setting for Color Card 80 x 25
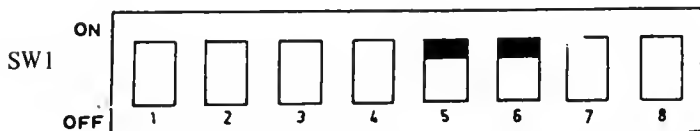
Switch Setting for the Enhanced Graphics Adapter

A-6

SW1-7   The.number of disk drives is determined by switches SW1-7
         and SW1-8.

SW1-8   In combination with SW1-7 the purpose of this slide switch
         is to determine the number of diskette drives in the system
         unit.

1 Drive

2 Drives
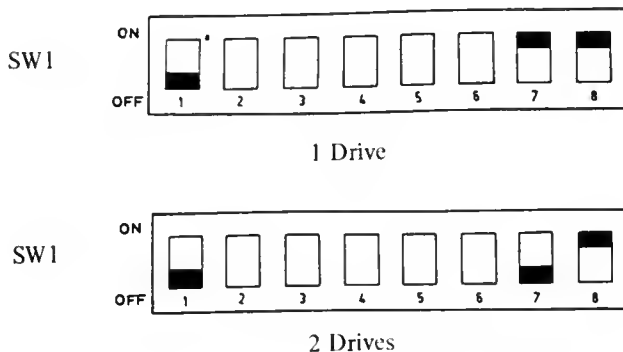
Fig. A-5 Switch Setting for SW1-7 & SW1-8

A.6 I/O Board Switch Setting

There is a DIP switch on the I/O board labelled as SW1. On SW1 are 6 slide switches and their default switch settings are as follows:

SWITCH	FUNCTION		ON	OFF	DEFFAULT
SW1-1	INT2	IRQ2	Enable	Disable	OFF
SW1-2	RTC0	Address 2C0H — 2C7H	Enable	Disable	ON
SW1-3	RTC1	Address 300H — 307H	Enable	Disable	OFF
SW1-4	COM2	Address 2F8H — 2FFH	Enable	Disable	ON
SW1-5	COM1	Address 3F8H — 3FFH	Enable	Disable	ON
SW1-6	LPT2	Address 378H — 37FH	Enable	Disable	ON

RTC = Real Time clock

Appendix B

RS232C Port Pin Assignment

DB9
9-pin
connector

DB25
25-pin
connector
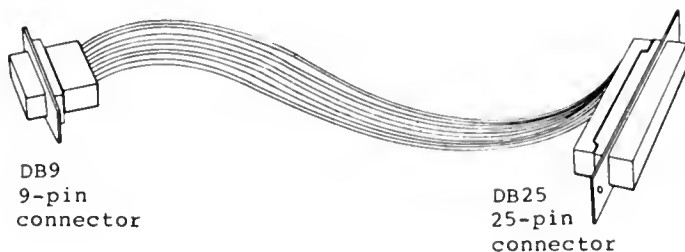
Fig. B-1 COM1 Cable

	Pin No.								
DB9	1	2	3	4	5	6	7	8	9
DB25	8	3	2	20	7	6	4	5	22

10-pin
connector

DB25
25-pin
connector
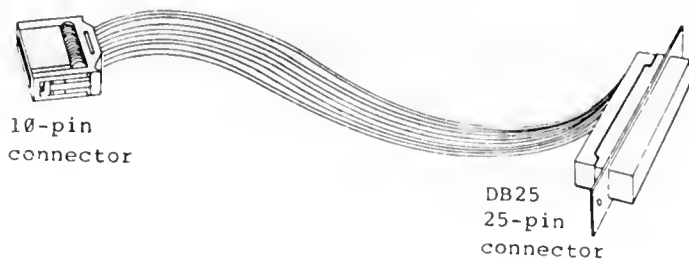
Fig. B-2 COM2 Cable

	Pin No.									
10-pin	1	2	3	4	5	6	7	8	9	10
DB25	25	22	8	20	7	6	5	4	3	2

PERIPHERAL	Description		RS232 PORT
	NC	1	
	Transmitted Data	2	
	Received Data	3	
	Request to Send	4	
	Clear to Send	5	
	Data Set Ready	6	
	Signal Ground	7	
	NC	8	
	NC	9	
	NC	10	
	NC	11	
	NC	12	
	NC	13	
	NC	14	
	NC	15	
	NC	16	
	NC	17	
	NC	18	
	NC	19	
	Data Terminal Ready	20	
	NC	21	
	NC	22	
	NC	23	
	NC	24	
	NC	25	

Appendix C

Monochrome Adapter Video Interface Pin Assignment

AT STANDARD TTL LEVELS

MONOCHROME DISPLAY		MONOCHROME DISPLAY AND PRINTER ADAPTER
	Ground	
	Ground	
	Not Used	
	Not Used	
	Not Used	
	+Intensity	
	+Video	
	+Horizontal	
	−Vertical	
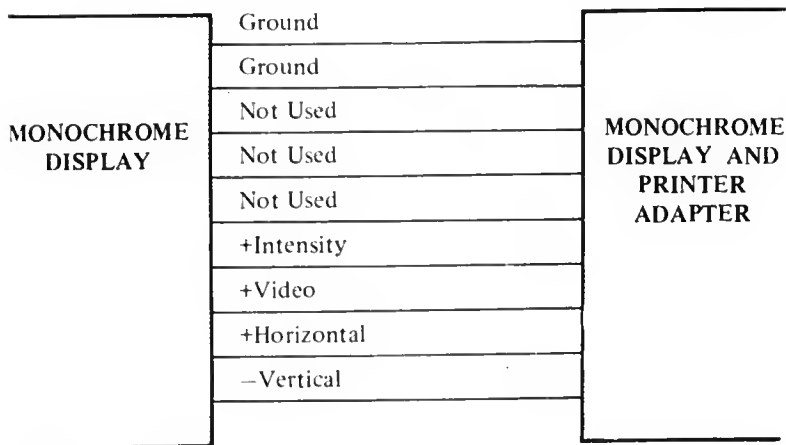
Appendix D

Color/Graphics Adapter Direct Drive and Composite Interface Pin Assignment

AT STANDARD TTL LEVELS

RGB COLOR MONITOR			COLOR GRAPHICS ADAPTER
	Ground	1	
	Ground	2	
	Red	3	
	Green	4	
	Blue	5	
	Intensity	6	
	Reserved	7	
	Horizontal Drive	8	
	Vertical Drive	9	

Chassis Ground

Composite Video Signal

2

1

| VIDEO MONITOR | Composite Video Signal | 1 | COLOR GRAPHICS COMPOSITE PHONE JACK |
| | Chassis Ground | 2 | |
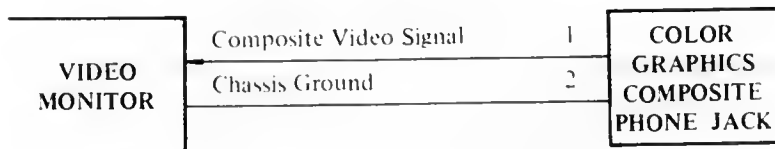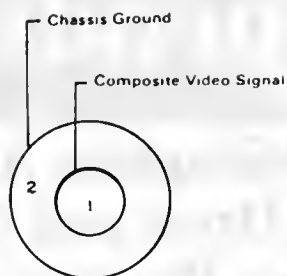
Appendix E

How to Install An Option Card

To install an option card into the system, simply follow the following steps:

1) Turn off the power switch on the rear panel of the system unit.

2) Turn off all external power switches (such as Monitor, Printer, etc.).

3) Disconnect all cables from the rear panel of the system unit, remembering distinctly where each cable was attached.

4) Place the system unit in a convenient position to allow easy access to the rear panel.

5) Remove the three screws from the cover with a flat screwdriver by turning them counterclockwise as shown below. (Save the screws for reinstallation of the cover.)
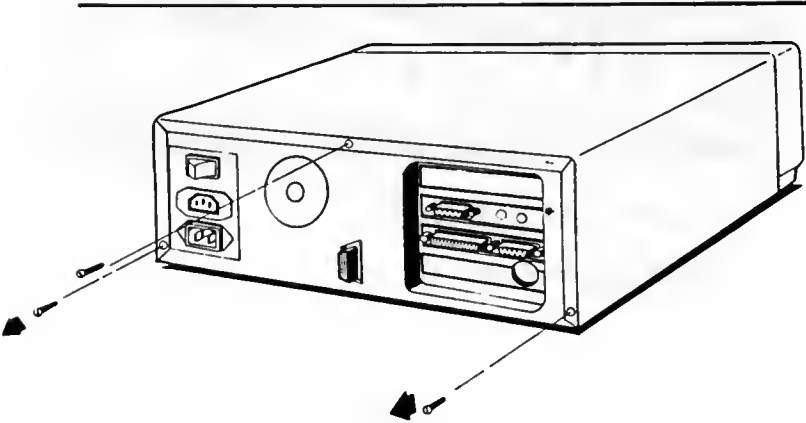
Fig. E-1 Removing the Screws

6) Carefully slide the system unit's cover a few inches toward the rear as shown below, then pull both sides a little bit sideways.
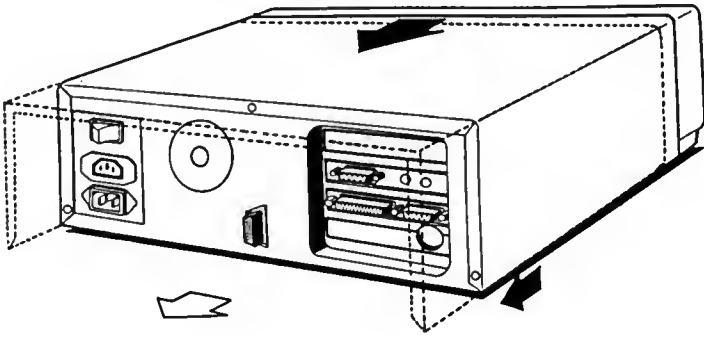
Fig. E-2 Opening the Top Cover

7) Raise the cover upwards and pull backwards. Set the cover aside.
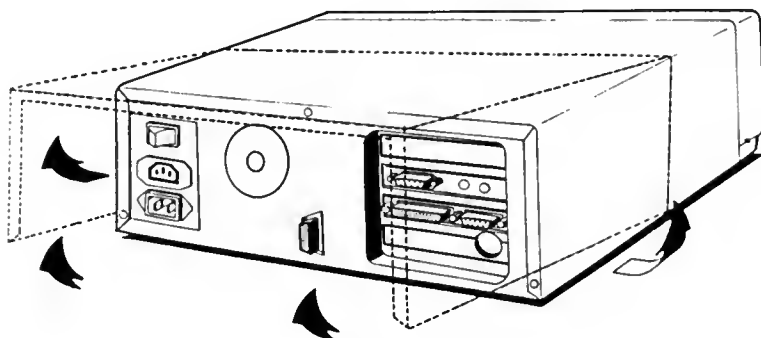
Fig. E-3 Removing the Cover

8) There are four expansion slots on the mother board. You can insert the option card in the unused slot.

9) Remove the metal strip that corresponds to the expansion slot by turning the screw counterclockwise (save the screw for the reinstallation of the option card.)
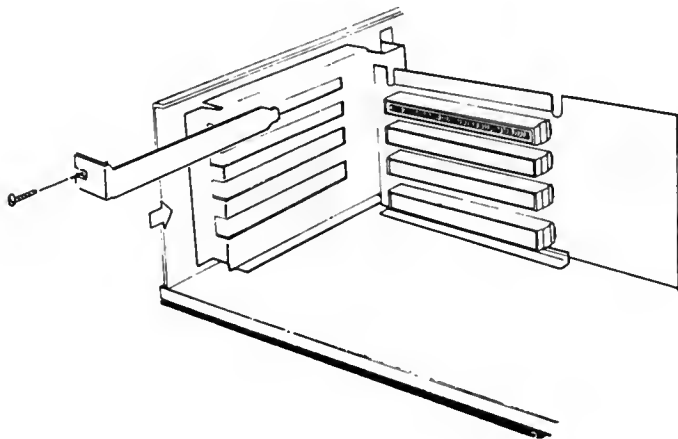
Fig. E-4 Removing the Metal Strip

10) Remove the screw on the card stopper and pull forward until
    it becomes horizontal. Insert the card horizontally. Make sure
    the card slides into the plastic groove on the right side.
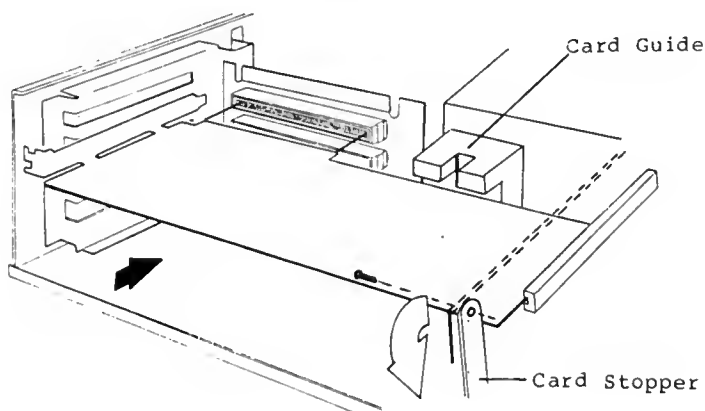
Fig. E-5 Inserting the Card

11) Note that the card should be inserted between two notches in
    the card guide. Screw the card in place. Return the card stopper
    to its original position and screw it in place.

12) Read the instructions for the option card and make the necessary
    connections if any.

13) Replace the cover and reinstall the screws.

Appendix F

BIOS Error Messages

When you power on the system unit, the firmware will perform a series of self-tests. The results of these tests are displayed on the screen. Note that the video display will remain blank for a few seconds after power up.

After powering on your system unit, you will hear a long beep generated by the built-in speaker unless an error occurs.

The possible errors are:

1.   System halt!

    DMA Register R/W error.

2. The system halts after generating a long beep, when an R/W or parity error has occurred in the memory range from 0 through 0FFFFH on the system board.

3. The system generates two short beeps after a long beep. This error occurs when R/W error is detected on the color/graphic adapter.

The first screen shows the results of the self-test:

```
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
BBBBBßBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB

          *** SELF-TEST ***

          RAM TEST (Y/N) ? X

          .RAM SIZE (K)    XXXX
```

NOTES:

A. The DIP switches on the system board are set for actual RAM size. If you have inserted additional RAMs on the system board, the DIP switches will have to be adjusted accordingly, else the screen message will not echo the correct RAM size.

B. The top three rows of the self-test messages are used to show whether the color signals are transferred normally between the system unit and the video display.

   If you use a monochrome video display connected to the system via a Monochrome Display and printer Adapter, the top three rows of the self-test will not be shown.

   But, if you use a color monitor, the "R" line is red, the "G" line green and the "B" line blue.

4. **.8259 Error!**

   This means 8259A PIC error.

5. **.8253 Error!**

   . Represents 8253 Timer error.

6. **PR.P.Err**

   Printer Port Error.

7. **K_B Error!**

   Keyboard not connected or out of order.
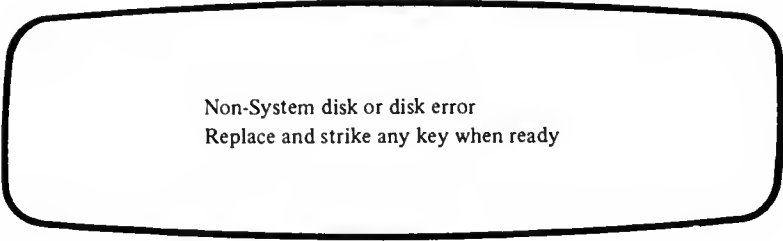
8. **.BAD FDC!**

   Disk controller error.

9. **Warning RAM Error!**

   Indicates that there is an error in one of the memory banks, the location of which is currently shown on the screen.

After the Self-test, the operating system will be booted into the system. At this point, if a non-system diskette was inserted in the default drive, the screen will display the following error message:

Non-System disk or disk error
Replace and strike any key when ready

Or, if no system diskette was inserted in the default drive, this error message will be displayed:

```
* No-system *
* Insert system disk and strike any key when ready
```

Appendix G

U43 Memory Mapping

A 32K ROM space (F6000 ~ FDFFF) is available at U43 and if you insert a 27256 chip in that location, the memory space should be mapped as follows:

27256 Chip	Memory Address
1st 8K bytes	F8000 ~ F9FFF
2nd 8K bytes	FA000 ~ FBFFF
3rd 8K bytes	FC000 ~ FDFFF
4th 8K bytes	F6000 ~ F7FFF

For your convenience, below is a cross reference:
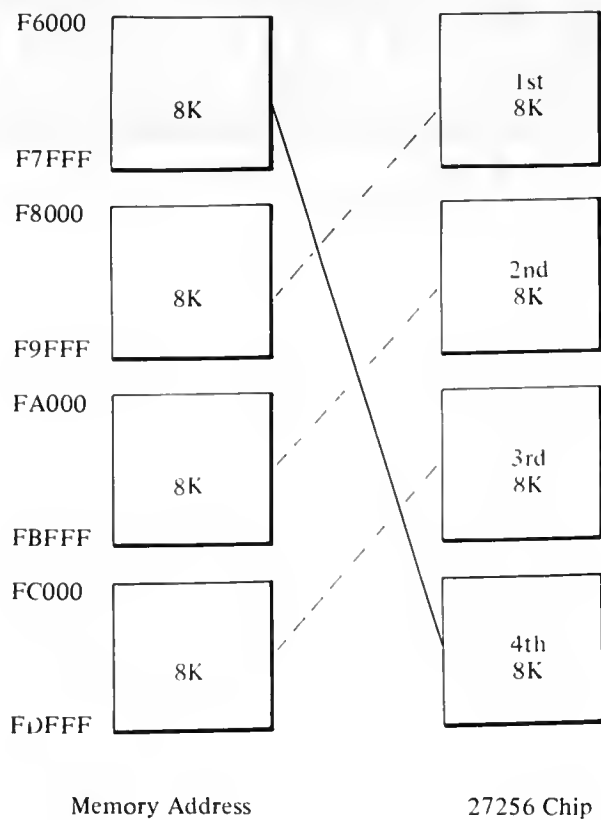
Fig. G-1 U43 Memory Mapping

Appendix H

Game Port Adapter
Pin Assignment

Adapter Pin No.	Function
1	+5 Vdc
2	Button 4
3	Position 0
4	Ground
5	Ground
6	Position 1
7	Button 5
8	+5 Vdc
9	−5 Vdc
10	Button 6
11	Position 2
12	Ground
13	Position 3
14	Button 7
15	+5 Vdc

Appendix J

The Clock Utilities

The clock utilities on the system diskette are Stime, Sdate and Today. Stime and Sdate are for setting or changing the real time while Today is for loading the real time into the system.

What is Real Time?

The real time clock on the IO board is battery backed-up, and keeps on operating even if the power of the personal computer is turned off. The time and date on the real time clock is called the real time.

To Set or Change the Real Time Date:

Enter the SDATE command under the following format:

>SDATE [mm-dd-yy]

Where

> mm   means month and it can be any number from 01 to 12.
>
> dd   means day and it can be any number from 01 to 31.
>
> yy   means year and it can be any number from 84 to 99, or a 4-digit number from 1984 to 2099.

If the date entry is valid, it is accepted and the system prompt appears. Otherwise, the system prompts the user to enter a new date with the following screen message:

Day Field

Current date is ____   mm-dd-yy

Enter new date:

The day of the week is displayed on the day field with the current date.

To enter the new date, use a − or / to separate mm, dd and yy. Dates can be set or changed by keying in the new date from the keyboard or from a batch file.

If you want the current date as is, just press the RETURN key.

To Set or Change the Real Time Clock

To change or set the time on the real time clock, enter the STIME command under the following format:

>STIME [hh:mm:ss.xx]

where

       hh   means hour and can be any number from 0-23.

       mm   means minute and can be any number from 0-59.

       ss   means second and can be any number from 0-59.

       xx   means hundredths of a second and can be any number from 0-99.

If the time entry is valid, it is accepted and the prompt appears. Otherwise, the system prompts the user to enter a new time with the following screen message:

```
Current time is      hh:mm:ss.xx

Enter new time:
```

Loading the Real-time into the System:

We can update the date and time in the system by loading the real time using the TODAY command:

>TODAY

The screen will display the following message:

```
Current day is day mm/dd/yy      Current time is hh:mm:ss.xx
```

where   day is the day of the week
              mm/dd/yy is the month, day and year
              hh:mm:ss.xx is the hour, minute, second and hundredths of
                      second

Note:

The real time clock does not have Feb. 29 on its calendar. In a leap year, Feb. 29 will be shown as March 1. So after Feb. 28, the calendar will be one day ahead. The user should set the real time using the SDATE command every leap year by doing either of the following:

1. If the user power up the system on Feb. 29, the date on the real time clock will show Mar. 1 (xday). To correct this, set the date back one day (Feb. 28 on the real time clock).

2. If the user turn on the system unit after Feb. 29, the date will be one day ahead, just set it back one day.

There is no need to correct the day of the week.